Please add new Claims 36 and 37 as follows:

36. (New) The thermal insulation system of claim 1, wherein the k value of the thermal insulation system is approximately 0.09 mW/m-K at below about $1x10^{-4}$ torr and approximately 2.4 mW/m-K at approximately 1 torr, for insulation having an approximately one inch thickness and boundary conditions of 77K and 290K.

37.. (New) The thermal insulation system of claim 12, wherein the k value of the thermal insulation system is approximately 0.09 mW/m-K at below about $1x10^{-4}$ torr and approximately 2.4 mW/m-K at approximately 1 torr, for insulation having an approximately one inch thickness and boundary conditions of 77K and 290K.

REMARKS

Original Claims 1-35 remain in the continuation application as originally filed. In the outstanding Office Action, a three way restriction requirement has arranged Claims 1-16 in Group I.; Claims 17-24 in Group II and Claims 25-35 in Group III. Applicants elect to prosecute the claims of Group I, Claims 1-16, in the present application. Applicants expressly reserve the right to file additional, divisional applications to protect the subject matter of the non-elected inventions.

It is respectfully noted that original clams 5-7 have been withdrawn from further consideration. In addition new claims 36 and 37, drawn to the invention of Group I have been submitted. Finally, independent claims 1 and 12 have been revised to better set forth the patentable subject matter of the present invention.

When examining the Group I Claims 1-4, 8-16, 36 and 37, it is respectfully requested that the unique features of the present invention be kept in mind. In particular, the insulation system is believed to have the unique attribute of being able to easily and freely conform to the three-dimensional configuration of any object to be insulated. The

insulation system is further unique because the vacuum is created outside/inside of the package and not just inside the package as with conventional insulation systems such as the relatively stiff panels used to shield refrigerators and the like. When the insulation system is placed into an annular space vacuum environment, the unique structure of the insulation system allows the structure to maintain its fully flexible, conformable characteristics. The thermal performance of the insulation system under soft vacuum (~1 torr) conditions is believed to be the best in the world. The present invention is unique because of its flexibility, construction, structure and materials.

Applicants request that the present Response to the Outstanding Office Action be entered and that an action on the merits of the elected claims be promptly issued. If there are any questions concerning this Response, the examiner is invited to contact applicants' representative at (321)-868-7214.

Respectfully Submitted:
Randy Heald
Randy M. Heald
Patent Counsel, Kennedy Space Center
Registration Number 28,561
Date: March 27, 2003

Any additional charges necessary to prosecute this application are authorized to be drawn against Deposit Account 14-0116.

CERTIFICATE OF MAILING

I certify that this correspondence will be deposited with the United States Postal Service as first class mail with proper postage affixed in an envelope addressed to: "Assistant Commissioner for Patents, Washington, DC 20231" on the date below.

03/27/2003
Date:

Carol Anne Dunn
Carol Anne Dunn
Paralegal Specialist

MARKED UP VERSION OF REVISIONS

IN THE TITLE

Please amend the title to read, "THERMAL INSULATION SYSTEMS".

IN THE SPECIFICATION:

On page 4, please replace the paragraph beginning on line 3 with the following:

There is a strong dependence of the heat-transfer coefficient, h_r, on temperature as an ~~object=s~~object's radiation, and thus the heat transfer medium, will depend largely on its temperature. Although radiation transfer may occur through gases, liquids or solids, these media will absorb or reflect some or all of the energy. Accordingly, radiation transfer occurs most efficiently through an empty, vacuous space.

On page 21, please replace the paragraph beginning on line 26 with the following;

Comparative studies of MLI and thermal insulation systems of the invention show that similar insulative properties can be obtained at high vacuum levels, while superior results are achieved at soft vacuum levels. The following Table 1 shows the values obtained with a typical MLI system (aluminum, foil and fiberglass paper, 40 layers) having about 46 layers per inch in comparison with three thermal insulation systems of the invention (#1, #2 and #3) having about 18 layers per inch and a fill layer of fumed silica. Variations within thermal insulation systems #1, #2 and #3 are expected due to differing final densities of powder.

IN THE CLAIMS:

Please delete Claims 5-7 without prejudice.

Please amend the remaining elected Claims as follows:

1. (Amended) A thermal insulation system, comprising:

at least one flexible insulating layer, wherein each flexible insulating layer is conformable to three-dimensional surfaces of an object to be insulated, and comprises:

a reflection layer, having a first surface and a second surface; ~~and~~

a spacer layer adjacent the first surface of the reflection layer, wherein said spacer layer further comprises:

a carrier layer; and

~~wherein the spacer layer contains~~a fill layer located between the carrier layer and the reflection layer and containing powder having a compressed density of approximately 1 to 10 times a bulk density of the powder.

12. (Amended) A thermal insulation system, comprising:

~~at least one~~a plurality of similarly constructed flexible insulating layers, wherein each flexible insulating layer is conformable to three-dimensional surfaces of an object to be insulated, and comprises:

a reflective layer, having a first surface and a second surface;

a carrier layer;

a fill layer adjacent the first surface of the reflective layer and interposed between the carrier layer and the reflective layer, wherein the fill layer contains powder having a compressed density of approximately 1 to 10 times a bulk density of the powder; and

at least one edge strip adjacent the fill layer and interposed between the carrier layer and the reflection layer.

Please add new Claims 36 and 37 as follows:

36. (New) The thermal insulation system of claim 1, wherein the k value of the thermal insulation system is approximately 0.09 mW/m-K at below about $1x10^{-4}$ torr and approximately 2.4 mW/m-K at approximately 1 torr, for insulation having an approximately one inch thickness and boundary conditions of 77K and 290K.

37. (New) The thermal insulation system of claim 12, wherein the k value of the thermal insulation system is approximately 0.09 mW/m-K at below about $1x10^{-4}$ torr

and approximately 2.4 mW/m-K at approximately 1 torr, for insulation having an approximately one inch thickness and boundary conditions of 77K and 290K.